

EXHIBIT 97

**IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF GEORGIA
ATLANTA DIVISION**

**DONNA CURLING, ET AL.,
Plaintiffs,**

v.

**BRAD RAFFENSPERGER, ET AL.,
Defendants.**

**DECLARATION OF
J. ALEX HALDERMAN IN
SUPPORT OF CURLING
PLAINTIFFS' REPLY IN
SUPPORT OF MOTION FOR
PRELIMINARY INJUNCTION**

Civil Action No. 1:17-CV-2989-AT

Pursuant to 28 U.S.C. § 1746, J. ALEX HALDERMAN declares under penalty of perjury that the following is true and correct:

1. I hereby incorporate my previous declarations as if fully stated herein.

I have personal knowledge of the facts in this declaration and, if called to testify as a witness, I would testify under oath to these facts.

2. Georgia's new voting system incorporates optical scanners and ballot marking devices ("BMDs") manufactured by Dominion Voting Systems, Inc. ("Dominion"). Under this system (the "BMD voting system"), all in-person voters will select candidates on BMDs; the BMDs will print a paper ballot that is supposed to contain the voter's selections in both human-readable text and as a machine-

4. However, Georgia can greatly strengthen the security of future elections through a straightforward procedural change. Rather than directing all in-person voters to use BMDs, the State could have in-person voters mark paper ballots by hand and reserve BMDs for voters who request to use them. This approach would require no additional equipment and would result in no loss in accessibility. Hand-marked paper ballots are already used in Georgia for absentee voting, and so they are prepared and printed for every ballot style in every election. The state's new optical scanners are already capable of counting hand-marked ballots.⁴ BMDs would continue to be available for voters who need them. Yet the risk that election outcomes could be hacked would be *far less* than under Georgia's planned system.

5. Georgia is an outlier in adopting BMDs for all voters. Only 403 counties in the United States have done so, and almost 40% of them are in Georgia.⁵ In contrast, the majority of election jurisdictions across the U.S. (representing nearly two-thirds of registered voters) provide BMDs exclusively for voters who request them (e.g., those with disabilities), which is much safer.

⁴ Id.

⁵ Stewart Decl. Ex. 2.

barcodes. Conversely, limiting the use of BMDs (without barcodes) to a smaller voter population reduces the risk than an attacker will strike at all, since such BMDs become a less appealing target. When BMD use is limited, an attacker would have to tamper with a larger fraction of BMD ballots in order to change election results by a particular amount. This makes it more likely that a noticeable fraction of BMD users will report errors than when the same number of misprinted ballots are distributed among the entire voting population. Furthermore, if the population of BMD users is smaller than the margin of victory, it will be impossible for a BMD-based attack to change the outcome.

35. Using BMDs for all voters has no practical security advantages compared to reserving BMDs for voters who request them. On the contrary, it makes BMDs a much more attractive target for attackers and leads to greatly increased risks for all voters—including the disabled—that their right to vote will be subverted by an attack on the BMDs. And regardless, there is no need for barcodes at all.

36. State Defendants argue that implementing HMBPs with a limited number of BMDs would violate the right to a secret ballot for voters with disabilities, because BMD ballots are distinguishable from hand-marked ballots, and some

precincts might have only one or a few voters with disabilities.²² This risk can be mitigated easily by having poll workers encourage a small number of non-disabled voters in each precinct to use the BMDs (without barcodes). This would ensure that there was at least some minimum number of BMD votes in each precinct. And because BMD voters in such circumstances would still be a very small number among the total votes cast, they would not be an appealing target for attack and likely could not be outcome determinative in any event, as I explained above.

37. Mr. Riccobono discusses a variety of other problems that voters with disabilities sometimes encounter when BMDs are used infrequently.²³ These include poll workers who are unfamiliar with the machines and BMDs that are malfunctioning or not properly set up. These issues must be taken seriously, but they are solvable administrative deficiencies rather than intractable technological problems. They can be addressed through well designed training, testing, and inspection processes without exposing all voters, including voters with disabilities, to increased security risks.

²² Dckt. 658 at p. 18.

²³ Riccobono decl. at 10.

being used as the primary means of recording votes in the majority of jurisdictions across the U.S., Dr. Gilbert cites no data to show that this really happens, and it is unlikely in a HMPB system. All a voter would need to correct an overvote is a new blank ballot, a writing implement, a surface on which to mark the ballot, and spot to do so privately. Moreover, only a small fraction of voters need to correct overvotes, so the overall effect on polling place throughput is likely to be small. By contrast, in an all-BMD system, having too few BMDs creates a bottleneck that will cause long lines—as does having BMDs that do not function properly.

44. Dr. Gilbert also expresses concerns about the potential for voters using HMPBs to mark ballots in a way that the scanners misreads or fails to recognize.³¹ This is certainly possible, but, as stated above, Georgia's scanners will warn voters when an improper mark results in an overvote or undervote. In any event, a rigorous risk-limiting audit would detect and correct any error in an election outcome that resulted from the scanners interpreting the voter's marks differently than a human would. Although it is possible that some marks might be ambiguous even to humans, evidence from past elections shows that such marks are extremely rare. During the

³¹ Gilbert decl. at 39(A).

2008 Minnesota Senate recount, only 14 ballots out of 2.9 million resulted in disagreement among canvassers about the voter's intent.³²

45. Dr. Gilbert claims that a BMD barcode can be “examined during pre-election testing or post-election audits or recounts to confirm its validity.”³³ This is misleading: although the barcodes on individual test ballots could be confirmed during testing, that has limited relevance to the ballots voters cast during the election. BMD malware would likely be programmed to cheat on only a fraction of barcodes, and an attacker could rely on other features such as the date and time or the number of times the BMD had been used to conceal cheating during testing.

46. Dr. Gilbert states that “a hand-marked paper ballot system is not accessible to voters with disabilities while a BMD system is.”³⁴ However, I do not understand Curling Plaintiffs to be challenging the use of appropriate BMDs by voters with disabilities. The security risks of using BMDs are much greater when they are used by all voters, especially with barcodes. Using HMPBs for most voters while providing BMDs (without barcodes) for voters who request them would result in no

³² “Minnesota’s Historic 2008 Election” (2009), available at <https://www.sos.state.mn.us/media/3078/minnesotas-historic-2008-election.pdf>.

³³ Gilbert decl. at 39(E).

³⁴ Id. 40.

loss of accessibility but would reduce BMD security risks for all voters, including voters with disabilities.

47. Dr. Gilbert states that it is, in his opinion, “unacceptable” that “proponents of hand-marked paper ballots while arguing that BMDs are insecure suggest that it is OK for people with disabilities to vote on [them].”³⁵ I am uncertain what he means by this, because he concedes that “generally any computer can be hacked”,³⁶ and he clearly believes that it is acceptable for people with disabilities to use computer-based BMDs. In my opinion, despite their security risks, appropriate BMDs (without barcodes) are the most secure category of voting technology now available for use by voters with certain disabilities. However, when all voters use BMDs, as in Georgia, they create a serious risk that outcome-changing cyberattacks will go undetected. Barcodes needlessly exacerbate this already serious risk.

48. Dr. Gilbert estimates that around 635,000 disabled voters cast votes in Georgia in 2016.³⁷ This does not imply that anywhere near that many voters require the assistance of a BMD to vote. The statistics Dr. Gilbert cites include voters with many kinds of disabilities, including ones that impact mobility but do not inhibit the private use of HMPBs. A better way to estimate the population that needs BMDs is

³⁵ Id. at 40(C).

³⁶ Id. at 44.

³⁷ 40(E)

to look to states that use HMPBs and make BMDs available to votes upon request. One such state is Maryland. The National Federation of the Blind of Maryland cites data from the Maryland State Board of Election showing that, during the 2016 General Election, only 1.8% of Maryland voters used BMDs.³⁸ There were 4.1 million ballots cast during the 2016 General election in Georgia, which implies that about 75,000 Georgia voters would have used BMDs, if Georgia voters used them at the same rate as Maryland voters. This is by no means an insignificant number of people, but nonetheless it is much smaller than Dr. Gilbert's data might imply.

49. Defendants incorrectly ascribe to Dr. Gilbert the proposition that “research shows that voters will verify their ballots when posted instructions are given, such as those required by H.B. 316.”³⁹ Dr. Gilbert, citing unpublished research by Dr. Michael Byrne, says only that *having a poll worker prompt voters* to review their ballots increases verification.⁴⁰ My own peer-reviewed study discussed above is in agreement that certain kinds of verbal prompts by poll workers can have a modest positive effect, but it finds no statistically significant increase in verification from signage reminding voters to verify their ballots, which is what H.B. 316 requires. And again, as I explained above, voter verification cannot reliably detect various

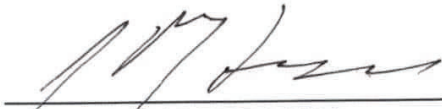
³⁸ https://elections.maryland.gov/about/meeting_materials/October_2017.pdf

³⁹ Dckt. 658 at p. 11.

⁴⁰ Gilbert decl. at 51.

attacks on BMDs, especially when barcodes that voters cannot read are used to tabulate votes.

I declare under penalty of the perjury laws of the State of Georgia and the United States that the foregoing is true and correct and that this declaration was executed this 16th day of December, 2019 in Ann Arbor, Michigan.



J. ALEX HALDERMAN